PARTICIPATORY WILDLIFE MANAGEMENT WORKSHOP IN LOMERIO

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Participatory Wildlife Management Workshop in Lomerío

Proyecto BOLFOR
Calle Prolongación Beni 149
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SECTION I
INTRODUCTION

BOLFOR's Lomerío Wildlife Management Program focuses on including the hunting community in wildlife management decisions. The program began by encouraging self-monitoring by hunters of their game take. In this way it was hoped to involve the hunters in the development of their own community wildlife management plan. During the past year several hunters have been participating in this program voluntarily, even to the level of collecting skulls and stomach contents. This wildlife workshop was designed to reinforce the existing hunter participation in the wildlife program and to increase the number of communities and hunters that are taking part. The two level participatory workshop was held the 18th through the 22 of March 1996 in San Lorenzo, Lomerío.

A. Summary of Results

A combination of participatory facilitation and practical training was used with 16 participants from 8 communities to introduce the idea of wildlife management and reinforce the awareness of the value of cultural knowledge to the management of wildlife in Lomerío. The split level course allowed those hunters who had already been participating to interact with the new hunters and for group discussions. Out of the group discussions a list of indicator elements for critical wildlife area identification was developed as well as a register of over 60 wildlife food species and their fruiting cycle. Hunters from each community were asked to map their hunting zones and the resulting maps were joined into a map of Lomerío. On this map, areas critical for each community's wildlife (and fisheries) resources were delineated.

Practical training was geared towards two levels, depending on whether the hunter had previously participated with the program. Booklets were produced to guide both levels of practical training. Other educational material included a Lomerío Mammals book which was filled out by the participants. A series of 4 posters of Lomerío mammals was also developed.

B. Summary of Recommendations

The Lomerío Wildlife Management Program seems to be increasing the number of hunters registering their game harvest as well as overall community interest. There is a major drawback with the "success" of the project in that present project staffing is already overtaxed, thus more hunter involvement adds more burden to the limited personnel. Community participation in the wildlife management program is probably the only way to have compliance with wildlife management decisions such as hunting seasons or reserves. The importance of the increasing community interest should not be overlooked. Indeed, it should be nurtured and reinforced. But community work is a long term process, such that BOLFOR should be training and advising APCOB (or if another stable NGO exists) which has historically worked in the region and can offer continuity to a wildlife management program.

The community has expressed an interest in continued hunter encounters and workshops. They particularly appreciated having some written material to be able to review. The participating hunters have asked for more help obtaining the collaboration of the other men in their community by presentations of the arguments in favor of participation both in verbal and written form. They have taken the issue as theirs, are volunteering their time filling out their game registers, and obtaining the skulls and stomach contents without cost to the project. This is a very high level of collaboration and may indicate a true interest in planning for wildlife resources by at least some of the community members. It would be a shame to waste this unique opportunity to encourage the natural resource planning process of the Lomerío communities by lack of personnel and continuity.

At this time is difficult to present the educational material in a culturally relevant format or structure because no research into ethnoclassification had been done in Lomerío. The way the Chiquitanos group (classify) their plants and animals is an important part of the cosmovision of the culture which is easily distorted by pushing our own "scientific" structure upon them (such as mammals). I recommend that the BOLFOR project include an "ethnoclasification" study, not a particularly difficult task but with very specific techniques. The results will enable any educational materials prepared by BOLFOR about Lomerío biodiversity to include and reinforce the cultural vision of the relationship between the species. This will also improve the reception of the message because the people will be more likely to identify with their own vision of the world.

SECTION II
STRUCTURE OF THE WORKSHOP

The workshop was organized in three sections, two levels of practical training and a group participatory session. The participatory section was held all day during the first and last days and in the afternoons. Practical training in basic wildlife terminology and techniques was offered in the mornings (figure 1). The final day several Chiquitano officials, including the president of CICOL, were invited to a summary session and closing event where certificates were presented to participants (Appendix I and II).

A. Participatory Sessions

The participatory sessions were focused toward increasing the hunters understanding of the rationale behind the wildlife program. Hunters attending both levels of the training worked together on activities which included mapping their hunting territories and discussing critical wildlife issues.

The first day's discussion centered around the problems that the collaborating game harvest monitors had experienced in their communities with regards to access to hunted animals. All the participants agreed that the community does not understand why they are collaborating because the others believe that they are earning money. Some hunters had refused to collaborate with the participants for that reason. The hunters expressed that even their mayors, especially the newly elected ones, had very little to no understanding of the wildlife program. Some of the participants requested that BOLFOR help supply them with written materials explaining why wildlife management should be important to the communities. They felt that if they had written support for their arguments, they would have an easier time explaining to their community.

The discussion then led to some of the reasons that monitoring the game harvest can be beneficial to the defense of that resource use and even their territorial rights:

* If the community knows how much game is harvested an economic value can be placed upon the resource, and thus the harvest rights can be more effectively defended
* If the community knows how much they usually harvest and the harvest falls drastically, they can then be informed about problems, and hopefully to prevent a complete loss.
* The information obtained can be used to help plan for the future.

Figure 1. Schedule for Wildlife Management Training Workshop in Lomerio 18-22 March 1996

	Monday	Tuesday	Wednesday	Thursday	Friday
AM	Travel	**Adv.Course** Evaluation of data collection process	**Adv.course** Production model-Skulls **Beg.course** Introduction Definitions-Habitat Wildlife Management	**Adv. course** Critical area ID Habitat-Water-Salt licks-Cycles **Beg.course** Techniques , weighing, forms, skulls	**Combined courses** Unification of Maps from all communities **Discussion** Identification of Critical areas, Hunting zone overlap
PM	Arrive-Introduction to advanced course	Evaluation and design of new data collection form	**Combined courses** Mapping of hunting zones by community members	**Combined courses** Mapping of hunting zones by community members	**CLAUSURA**

As the group talked about defending wildlife as a necessary subsistence resource, one point became clear. The hunter's feel powerless against the persistent burning that happens in Lomerio during the dry season. They know that the burning affects the wildlife and their food sources and they want to prohibit uncontrolled burning. However this conflicts with the cattle owners (sometimes in the same community), who desperately need the re-sprouting grass for their animals. Another source of run-away fires is when the farm plots are burned recklessly. Again participants requested educational materials to support their argument for more carefully planned burning.

When talking about prohibiting burning, it was brought out that prohibiting something often makes people want to do it to be rebellious. We discussed this in relationship to hunting when some hunters mentioned that some of their fellow community members thought that the "gringos" want to prohibit hunting. It was heavily stressed that, on no account would this be, or should this be a decision of the "gringos". Any and all management decisions must come from the community's perceived solutions to wildlife problems. All of the hunters were warned to be careful not to be misunderstood by their neighbors on this point. BOLFOR is not prohibiting their subsistence hunting activities.

A new game registration form was designed with the participation of the hunters. Several problems on the first form were resolved and an easier way to respond was decided upon. The hunters wanted the questions in Chiquitano but with Spanish underneath. A draft data form was used in the training session, and the problem spots were highlighted and corrected during the group session on the final day. The main problem was the small size of the lettering in Spanish, because many of the older hunters could not read without glasses. The new orthography of their language (established in the meeting of Feb 1996) caused most of the hunters to be unable to read the questions in Chiquitano. Instead they read the Spanish, but for the older hunters, the Spanish lettering was too small. Increasing the size of the letters caused some slight re-arrangement in the final form (Appendix III). It was very clear they wanted the Chiquitano writing on the form.

During the last group meeting, techniques for evaluating the wildlife populations were explained. Evaluation using line transect methods were superficially explained and their practicality for Lomerio was discussed. The parallel transect technique used by Kim Hill and the Ache of Paraguay was also presented. One of the hunters had experience with the line transect technique and felt this was the best technique for the Lomerío wildlife management program.

Another population estimating technique discussed was game drives. Most the participant hunters expressed a concern that a drive count would be used for hunting. They felt that to get a group together to drive animals would be very suspect in the community. (After all, what hunter would believe that another hunter might let that juicy urina get past him without even trying to kill it). The wildlife management program is too recent and is just beginning to gain collaboration in the community. It may be detrimental to the trust that has so far been developed to try a drive this dry season. It would be a real shame to begin the gossip or give fuel to those who might want to present the program in a bad light. The trust that the program has gained in the community so far is not an easy thing to have obtained. It would be a shame to precipitously use a technique which could give fuel to any mistrust existing in the communities especially if the real management decisions are to be made by the community. The type of wildlife census method is a wildlife management decision and the participating hunters have expressed their opinion. I think it is something worth trying in the future when a broader understanding of the wildlife management program has been achieved.

A1. Critical Areas

In the final participatory session the concept of areas that are critical for wildlife and fisheries production was discussed. The importance of these areas to wildlife could be derived from the presence of limited resources such as a water, salt, or keystone food species. Those areas the hunters felt were critical to the community's wild animal protein production were drawn on a large map of Lomerio (See Appendix IV). The participants developed the following list of types of areas that are critical for wildlife and thus should be protected:

* Springs (puquios)
* Salt licks (salitrales)
* Deep pools on the river (pozos hondo del rio)
* Stands of Motacú (*Scheelea princeps*: Motacusales)
* Spots of water-containing plants (groves of Sipoi, pica-pica)

In conjunction with the discussion of critical areas, participants were asked to identify those environmental elements such as plants or salt licks which indicate good wildlife habitat. The following list of visual clues was provided:

* Sprouting bamboo
* Santa Lucia (*Commelina erecta*, fruit eaten by taitetu; similar to a peanut.)
* Wild potato
* Sipoi (in monte alto)
* Rotting tree trunks (such as motacú, used by urina, oso bandera, tejon, anta)

* Paquió (*Hymenaea courbaril*; root -Jochi)
* Heliconias (patuju, eaten by taitetu)
* Patujucillo (small with a wide leaf)
* Root of the "pica pica" (*Urera*, contains water)
* Garabata (*Bromelia* , eaten by tropero)
* Salt licks
* "Sipoi de bejuco"
* "Achachairucitos" (in Motacú stands)
* Low humid areas for earth worms etc..
* In Savana habitat look for "Guinda", "Palmas" o curíche
* Areas around farm plots (products attract various game species)

A2. Lomerío Mammals Book

At the beginning of the workshop, participants were given a booklet with 34 pictures of large mammals found in Lomerio. The facing page had the name of the mammal in Chiquitano, Latin, and Spanish. The hunters were requested to report each animal from their experience by adding weight, diet, habitat, and location where the species is found in Lomerío. They were asked to work on these booklets during their free-time throughout the workshop. At the end of the week we collected the booklets to collate the information and return it to the communities with the permission to use the drawings from Fiona Reid (Appendix V). The animals were not listed in any particular order, and no ethnoclassification structure was solicited at this time

A3. Fruiting Cycle

The participants named the fruit species eaten by the wildlife and when they are in season. The list included more than 60 fruits and seemed to cover the entire year (Table I). One species, the motacú palm (*Scheelea princeps*), when growing in large single species stands has fruit all year long. Some savanna fruit bearing species were also listed by the participants (Table I).

A4. Recommendations for the Community Leaders

The final topic discussed were any recommendations the participants would make to their community leaders about wildlife management, especially what we had discussed during the workshop. The result was a list of points the hunters felt should be expressed to their leaders. The participants added another list of recommendations focused at BOLFOR. The following recommendations were suggested by the participating hunters:

* They should hold meetings with the community to explain to the people about the wildlife program
* The hunting zones should be conserved
* The deep river pools should be protected and not poisoned (no barbasquear)
* Take precautions while burning
* Don't cut fruit trees down, especially those wildlife food species

Table I
Fruiting Cycle of Wildlife Food Species in Lomerío , Bolivia

COMMON NAME	SCIENTIFIC NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Notes
Achachairú	*Rheedia brasilensis*	x	x	x										
Aguaí	*Chrysophyllum gonocarpum*(b) *Pouteria cf. lucinifolia* (b)						x	x						
Alcornoque (flor)	*Tabebuia* sp.(b)							x	x					Pampa
Almendro	*Dipteryx alata*			x										
Ambaibo	*Cecropia* spp.			x	x									
Azucaró	*Spondias mombin*			x	x									
Azucaró de pampa	*Linociera cf. hassleriana*												x	
Bí	*Genipa american*	x	x											
Bibosi chico	*Ficus* sp.	x	x	x	x									
Blanquillo			x	x										
Cabeza de mono	*Apeiba tibourbou*	x	x											Jochi Puerco espin, mono
Chichapí	*Celtis spinosa*	x												
Chirimoya de monte	*Rollinia herzogii* *Duguetia guitarensis* (b)		x	x										
Coco	*Guazuma ulmifolia*								x	x				
Conservilla	*Alibertia* sp.	x												Pampa

Source: Participitory wildlife workshop, Lomerio, Plant ID by Marisol Toledo “Ethnobotony of Lomerío,unless (b) from Wildlife Programs data files.

Table I (cont.)

Fruiting Cycle of Wildlife Food Species in Lomerio, Bolivia

COMMON NAME	SCIENTIFIC NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Notes
Cusi	*Orbignya phalerata*												x	
Flor de Tajibo (Amarillo)	*Tabebuia* sp.												x	
Flor de Toborochi	*Chorisia* sp.					x	x							
Gallito (Flor)	*Pogonopus tubulosus Erythrina dominguezii* (b)						x							
Garabatá	*Pseudoananas sagenarius* (b)			x	x									
Guapurú	*Myrciaria cauliflora*											x	x	
Guapomó	*Salacia eliptica*	x	x											
Guayaba	*Psidium guajaba*	x												
Guayabilla	*Psidium guineense*		x	x										Pampa
Güembe	*Philodendron undulatum*			x										
Isotoubo	*Sapindus saponaria*						x	x						
Jorori	*Sacoglottis mattogrosensis* (b)									x				huaso taitetu
Juno	*Pithecellobium scalare* (b)						x	x	x					
Limoncillo												x		
Macararú	*Caryocar brasiliensis* (b)							x	x	x				Pampa
Lúcuma de monte	*Pouteria macrophylla*												x	

Source: Participitory wildlife workshop, Lomerio, Plant ID by Marisol Toledo "Ethnobotony of Lomerío,unless (b) from Wildlife Programs data files.

Table I (cont.)
Fruiting cycle of wildlife food species in Lomerío, Bolivia

COMMON NAME	SCIENTIFIC NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Notes
Machochose	*Hexaclhamys* sp.					x	x							Pampa Hurina taitetu
Mani de monte	*Sterculia sp. Pithecebellium corymbosy* (b)								x					
Maslillo							x							
Motacú	*Scheelea princeps*	x	x	x	x	x	x	x	x	x	x	x	x	Todo el año, todos comen
Motecillo				x	x									Pampa
Motoyue	*Melicocca lepidopetala*										x	x		
Murure	*Brosimum gaudichaudii, B. spp.* (b)										x	x		pampa
Pabicillo		x	x											
Pachio de Monte	*Passiflora cinncinata*						x	x						
Pacobillo	*Capparis prisca Dendropanax arboreus* (b)	x												
Pacayi (1)	*Inga* spp.	x											x	
Pacay (2-grande)	*Inga* sp.		x	x										
Peki	*Pseudobombax marginatum*					x								Pampa
Penoco	*Samanea saman, Albizia saman* (b), *Pithecellobium saman* (b)						x	x	x					

Source: Participitory wildlife workshop, Lomerio, Plant ID by Marisol Toledo “Ethnobotony of Lomerío,unless (b) from Wildlife Programs data files.

Table I (cont.)
Fruiting cycle of wildlife food species in Lomerío, Bolivia

COMMON NAME	SCIENTIFIC NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Notes
Paquió	*Hymenaea courbaril*								x	x				
Pitajaia	*Selenicereus coccineus*												x	Hurina
Piton	*Trichilia anaequilatera (b)* *T. elegans (b)*	x	x											
Piton	*Talasia esculenta*	x	x	x										
Pluma de Piyo	*Strypnodendron sp (b)*													Pampa, Ramonillo, piyo
Ramo (frijol)	*Senna / Cassia ?*										x	x		
Sahuinto							x							
Sinini	*Annona sp.*	x	x											Pampa
Sirari	*Peltogyne sp.*								x	x				
Sumuque	*Syagrus sancona*												x	
Taruma	*Vitex cymosa*	x	x											
Toco	*Enterolobium contortisiliquum*								x	x				
Totai	*Acrocomia aculeata*										x	x	x	pampa y monte
Ttutumillo	*Magonia pubescens*					x	x							Pampa
Turere										x				pampa
Bibosi mediana	*Ficus sp.*					x	x	x						
Bibosi grande	*Ficus sp.*						x							

Source: Participitory wildlife workshop, Lomerio, Plant ID by Marisol Toledo “Ethnobotony of Lomerío,unless (b) from Wildlife Programs data files.

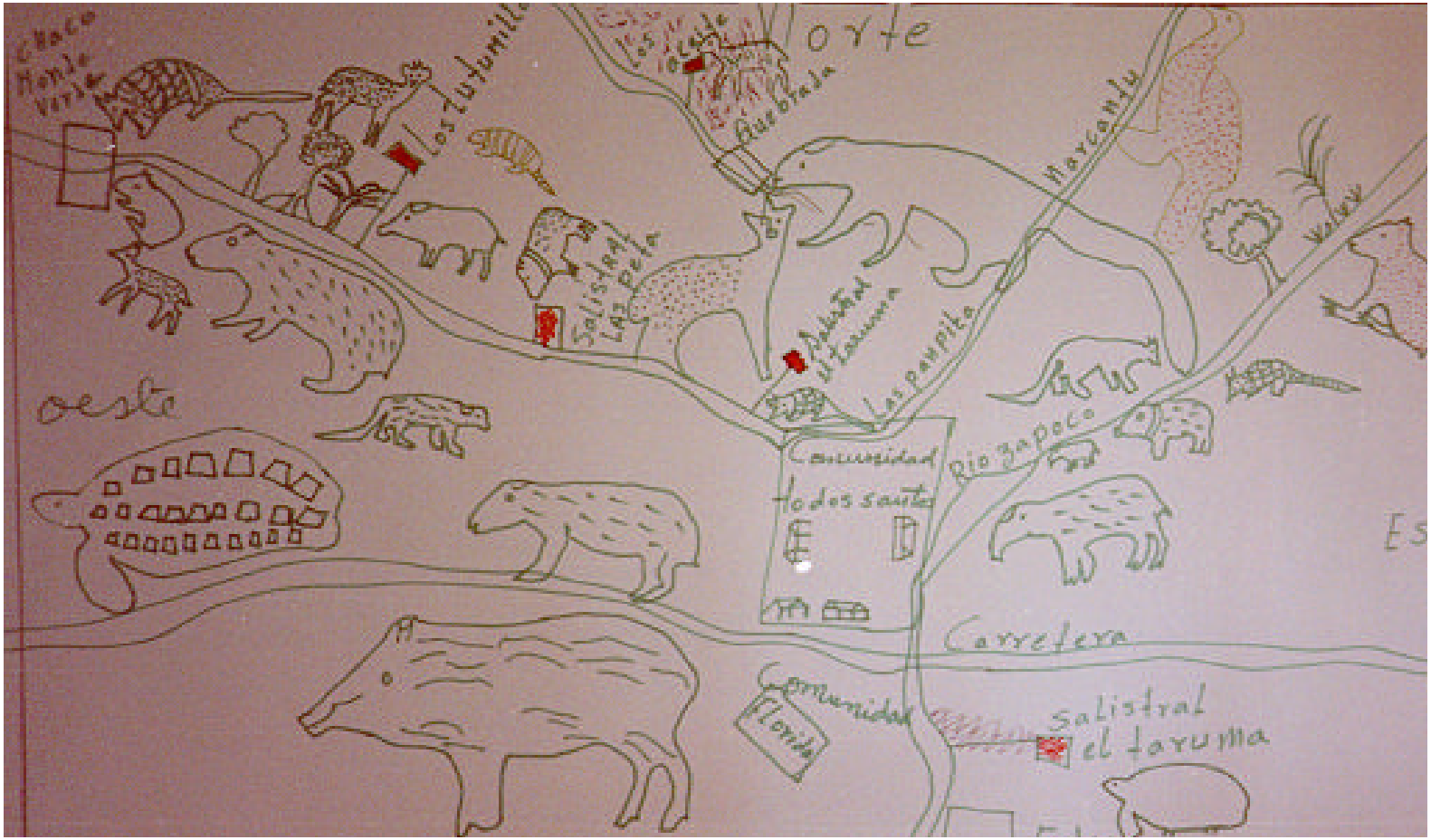
A5. Recommendations for BOLFOR

* Have more group meetings with hunters, hunter encounters (Encuentros de Cazadores) to increase hunter participation.
* Continue with and have more training and explanation sessions
* Write educational material about the dangers of burning and why they should manage the wildlife
* Help the process of educating people about their environment with their own knowledge systems
* Put the recommendations of the workshop in written form to present to the mayors.

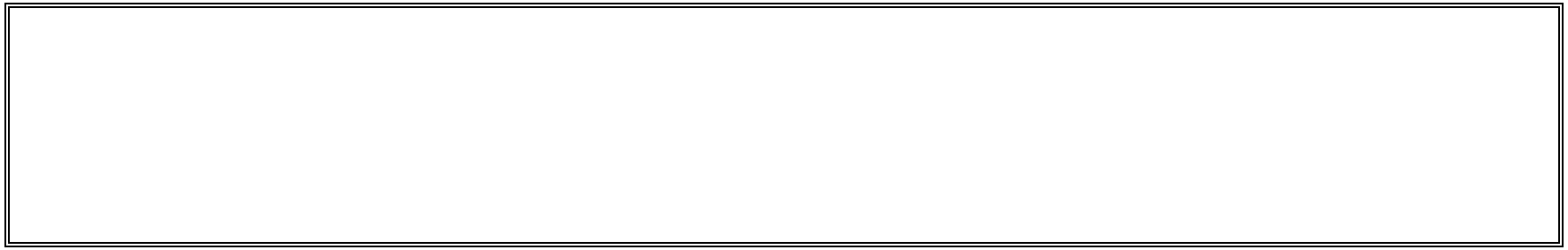
A6. Maps of Community Hunting Zones

The hunters spent the afternoons preparing maps of their hunting zones. The objective of this exercise was two fold. First it was to begin the process of communication between the hunters as to areas that they are using in common. Secondly it was to have them show how they visualize their hunting area. Paper and poster board was made available to them along with cut out animal pictures and different colored markers. The drawings on the following pages show that the Chiquitanos have an image of a map that is not far from that recognized by professionals. What is not clear is whether what some of the men drew were their hunting zones, because many of the drawings appear to coincide with the territorial boundaries. It is unclear what the hunters have in mind by hunting zones. On the final day each community's participants were asked to present and explain their map to the rest of the group. When the participants from Cerrito were asked whether they had drawn where they go to hunt, they responded in the affirmative. However the hunters also explained there was very limited hunting. It is quite probable that the new territorial boundaries around the communities have caused confusion over what is to be permitted, and where. For example, Cerrito is completely surrounded by other communities and without access to undisturbed forest. The actual area of the territory is small and there seems to be conflicts between some Cerrito community members and neighbors about cattle. Therefore the hunters from that community could possibly feel unsure about showing they hunt in neighboring territories. Not all of Cerrito's neighbors were present. It is a topic interesting to pursue and it is closely related to the success of wildlife management planning. It is extremely important to increase communication between communities on wildlife issues. On the following pages are the maps drawn by the workshop participants.

This is the hunting area drawn by the Fatima community members José Chuvé Aguilar and Ignacio Cuasace Pesoa.

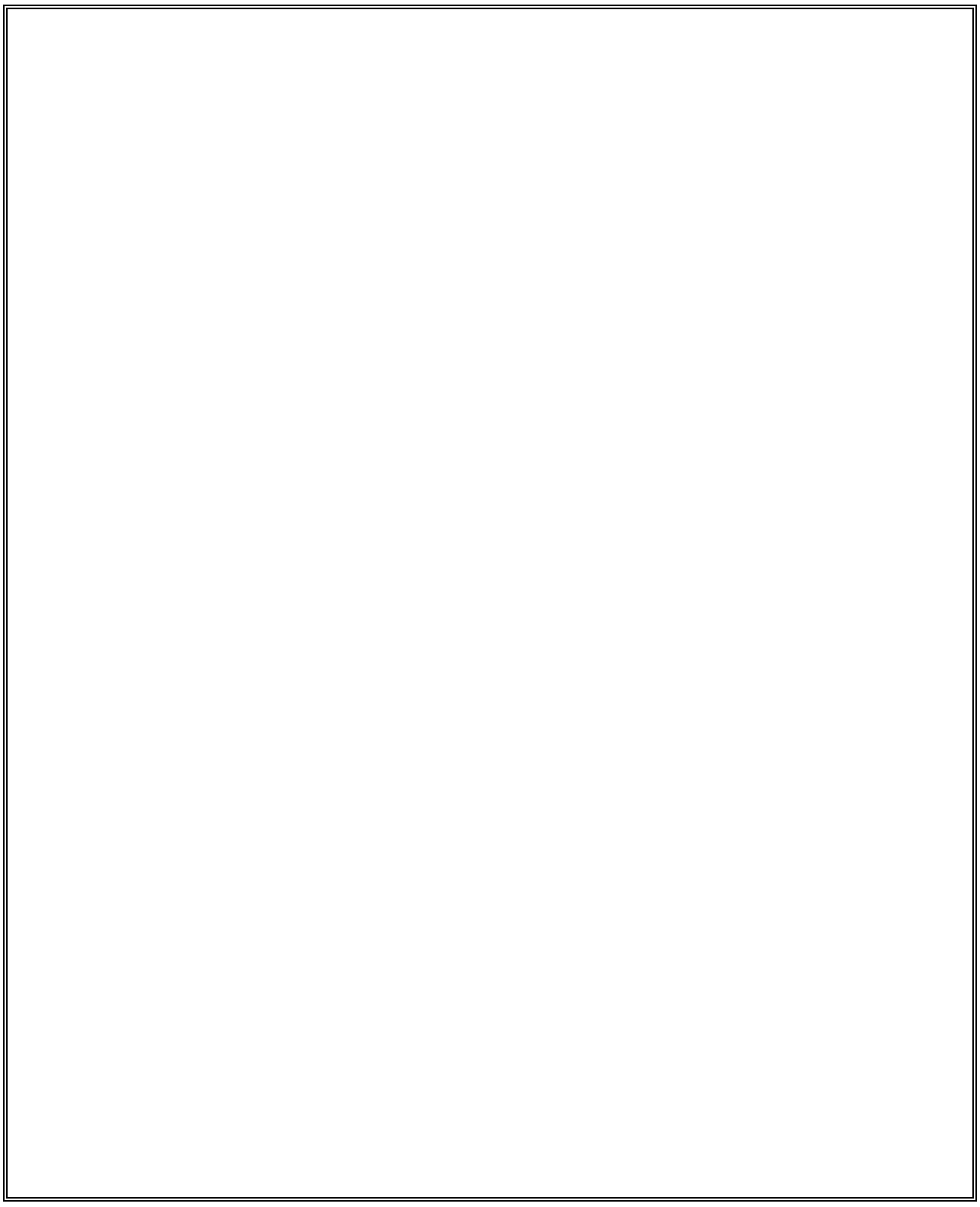


This is the Todos Santos map drawn by José Soriocó Chuvé. Miguel Bailaba Soriocó and Juan Parapaino Rodríguez

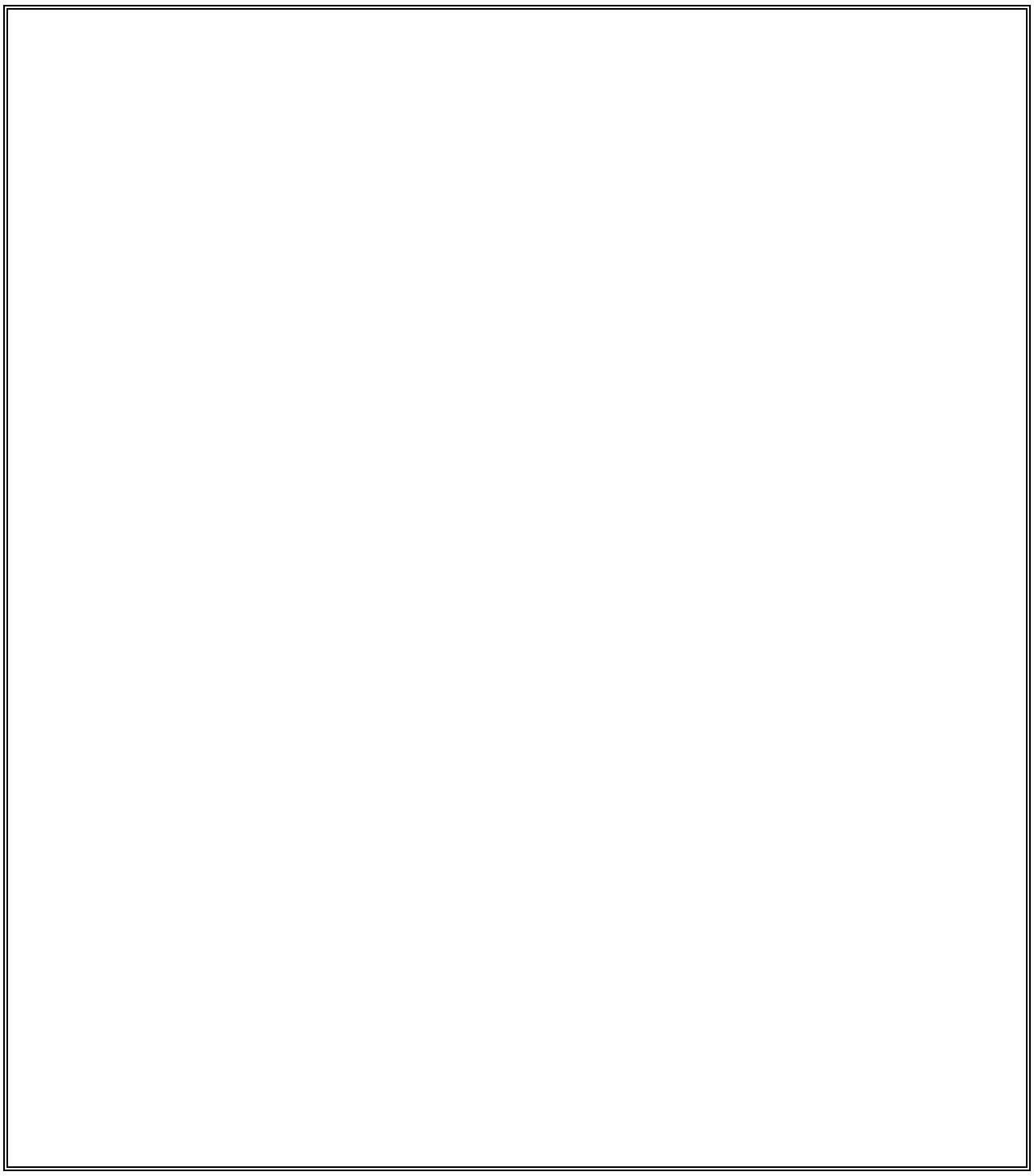


This is the map drawn by the Cerrito community members Pedro Surubí Soriocó, Luis Ipi Pesoa, and Esteban Bailaba Pesoa

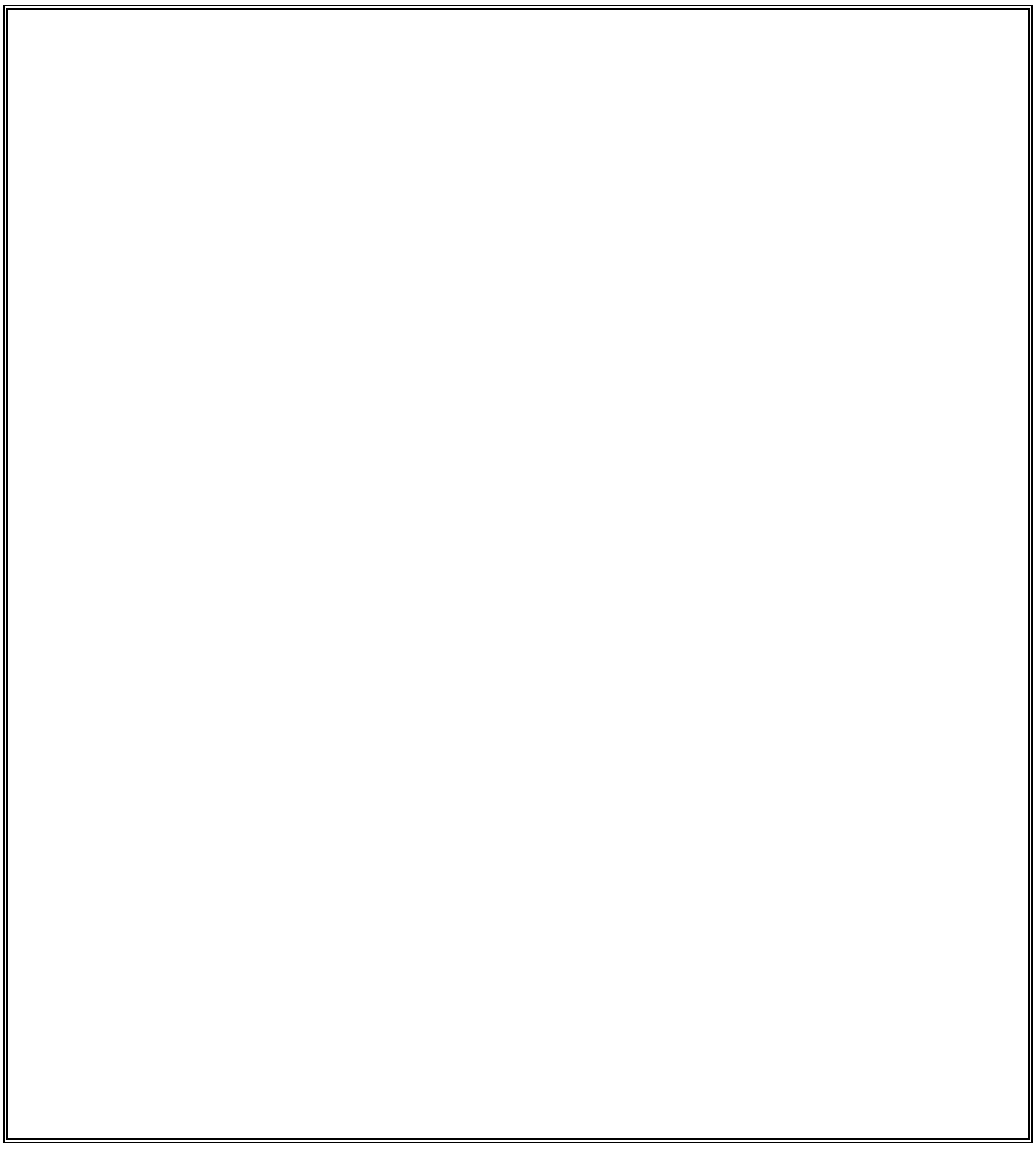
This is the San Lorenzo hunting and fishing area as drawn by Benito Chuvé Palachay.



This is the Santa Anita map as drawn by Jesús Cuasace Aguilar and Francisco Cuasace Aguilar



This map was drawn by the hunters from Las Tranchas and Puesto Nuevo, Francisco Aguilar Soriocó, Eusebio Rivera Chuvé and Juan de Dios Surubí García.



This map was copied by Juan de Dios Surubí García to have a copy to take to his community of Puesto Nuevo

B. Training Sessions

B1. First Level

The training for the first level participants was geared towards introducing various ecological terms, especially those that are important in managing wildlife. Daniel Guinart guided the participant's discussion of the idea that wildlife can be managed and sustainably

used, following the outline in the course syllabus (Appendix VI).

The participants of the first level course were as follows:

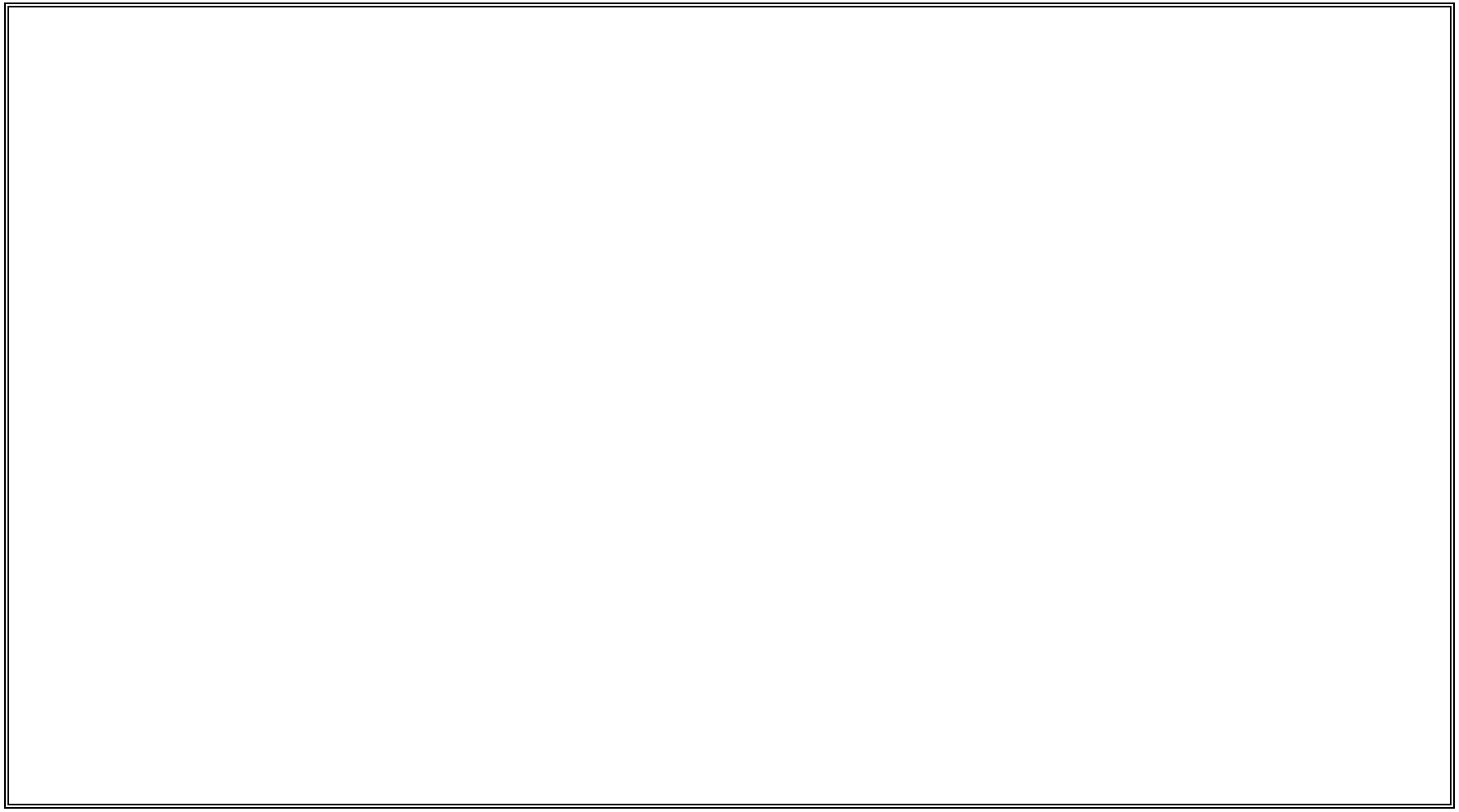
Hunter	Community
1 Juan Parapaino Rodriguez	Todos Santos
2 Francisco Aguilar Soriocó	Las Trancas
3 Pedro Surubí Soriocó	Cerrito
4 Luis Ipi Pesoa	Cerrito
5 Esteban Bailaba Pesoa	Cerrito
6 Juan Chuvirú Chuvirú	Monterito
7 Benito Chuvé Palachay	San Lorenzo

The explanation of ecological terminology focused on concepts important to wildlife management such as the food chain and energy cycle. In addition to these ideas being explained in the training, the students were given a course pamphlet which defines the terminology and concepts presented (Appendix VII) Included are an explanation of sustainable use and wildlife management.

The concept of habitat was explored with a participatory mapping session. This was shortened from the first time this level was taught because of time limitations so that an inclusive listing of species in each habitat was not obtained. However the participants were guided to produce a profile of the different Chiquitano habitats. The animals were placed in their habitats by the participants taping a drawing of the animal in the habitat which it is found. The representation that the participants developed is presented in figures 3, 4, and 5 on the following pages.

The participants in the first level were taught how to monitor their game catch using the forms developed with the group on the first day. They were provided with hanging scales and taught how to weigh the animal and where to put the information on the form. The participants also practiced writing the other information on the forms using imaginary scenarios.

Training in evaluating the tooth wear categories was accomplished using skulls collected by the participating Chiquitano hunters. The trainees were shown how to establish an adult age class by differentiating between teeth with no wear to those showing heavy wear. Considerable interest in this exercise was shown by the participants.



Habitat profile made by participants in the first level training, Wildlife Management Workshop, Lomerío, Bolivia

Habitat profile made by participants in the first level training, Wildlife Management Workshop, Lomerío, Bolivia

Habitat profile made by participants in the first level training, Wildlife Management Workshop, Lomerío, Bolivia

B2. Second Level

The second level training was geared towards those hunters who have already been registering their own game take. For these hunters the training was focused on reinforcing their collaboration by explaining the reason the information they have been recording is important to Lomerío wildlife management. The outline of the second level course can be found in Appendix VIII.

The participants of the second level training were as follows:

Hunter	Community
1 José Chuvé Aguilar	Fátima
2 Ignacio Cuasace Pesoa	Fátima
3 José Soriocó Chuvé	Todos Santos
4 Miguel Bailaba Soriocó	Todos Santos
5 Juan de Dios Surubí García	Puesto Nuevo
6 Eusebio Rivera Chuvé*	Las Trancas
7 Jesús Cuasace Aguilar*	Santa Anita
8 Francisco Cuasace Aguilar	Santa Anita
9 Santiago Rodriguez Faldín	Las Trancas

* hunter did not have prior first level training

This training began with an explanation of the production model of wildlife management (accompanied by the pamphlet in Appendix IX). The reason for this explanation is that the data they are collecting is useful for using this model. But before the explanation could be made the mathematical terms, average and percentage needed to be clarified. An explanation of decimals for the common fractions was also offered.

Some methods were explained as to how to evaluate the wildlife populations using the information collected by the hunters. By noting the time spent hunting, the hunters can be aware of changes in animal availability which might point to population reductions of certain species. Another method by which to evaluate the game populations is by looking at the relative age ratios of the harvested species (assuming that the Chiquitano hunters are not selectively hunting any particular age group). These age structures can be represented in two ways: 1. as a graph of percentage of the species in three age categories (young, juvenile, adult) and 2. as a survivorship curve. The latter method is only possible for those species where tooth wear is visible, such as the ungulates. The hunters were shown how to determine the tooth wear categories on some deer and peccaries skulls that they had collected.

The wildlife production model requires wildlife density estimates. The difficulty of obtaining these estimates was discussed with the participants and the traditional techniques were explained. Since the objective of the Lomerío project is to involve the community, a game drive was suggested for evaluating the wildlife densities of a small area. The hunters seemed doubtful about this technique, and expressed a concern that other community members would think they were scaring up game to hunt it. Other techniques that were explained included line transects,

and aerial counts. One of the experienced hunters had done line transects with Daniel Guinart and he explained the field work to the rest of the advanced participants. None of the mathematics of the analysis of results was attempted. Finally the parallel transect method used by the Ache hunters in Paraguay was also described.

Factors which limit the production of wildlife were discussed, including both the environmental and biological points. The utility of the hunter's observations on reproductive females became clear as we began to talk about the importance of knowing how often each species has young, and how many it has. The previous practice with averages and percentages became of critical importance when talking about the overall reproduction and productivity of the female and the individual. Other limiting factors were discussed, and the hunters turned to a lively discussion about the damage done by burning.

One of the community members had been asked by his community to summarize the results of the hunting he had registered. He presented his table which had been summarized by hunter for the total number of animals and kilograms that were harvested. This option was discussed as well as another table design which would help them separate by animal. Second level participants were given a calculator with which to summarize their data. A detailed training session was given on how to use this tool, and participants practiced with examples of averages and percentages.

The hunters were asked to return to their community to try to evaluate what percentage of the hunting they were able to record. The suggested way to do this was to first list all the hunters and whether they have their own fire arm. Then next to the list they can categorize the collaboration of that hunter as " 0, poco, mitad, todo". It was recommended they report monthly about each hunter's participation. It was clearly explained that the reason for this information is not to punish the others for non-collaboration, but to improve the quality of a community harvest estimate.

The experienced participants also had a chance to practice filling out the new forms. Thus they too were able to add their input into the revised form. The most outstanding compliant was the small lettering for the questions in Spanish. The hunters could not read the Chiquitano writing since the orthography has changed.

Figure 3 gure 4

Figure 5

SECTION III
CONCLUSION

The workshop was very well received and the participants were actively involved. The participation of CICOL was lacking, even though they had expressed disappointment at not being included in the last "cursillo". Among the participants, there was a real interest in the topics presented and BOLFOR was requested to continue these workshops. In some communities a number of hunters are already volunteering their game to be measured by the monitors. The participants felt that efforts should be made to recruit more hunters into the program.

The participatory portion of the workshop was particularly productive. The lists of plants and indicator species are crucial pieces of information necessary for the wildlife planning process. It is hoped that the indicator species list can guide inventory and evaluation procedures necessary for forest management decisions to consider wildlife. The food species phenology list shows a variety of food species are available all year around.

To date there has been an excellent level of collaboration by the hunters with the Lomerío Wildlife Management Program. The situation shows the potential for a truly involved hunter community. But before this can happen the slow process of extending the information and training to the other hunters must continue. Community wildlife management is not a short term process. Considerable environmental education with the promotion of the idea that wildlife is a harvestable resource must be undertaken before maximum collaboration can occur. BOLFOR is a short term project with only a few more years to run. It is a shame to think that the wonderful effort and collaboration the community is giving this project will all come to naught when the BOLFOR project ends. This would be a real loss. It is important to promote and train persons in other institutions or NGO's to provide longer term stability of this so-far very successful project.

SECTION IV
RECOMMENDATIONS

* 1. Develop a program of "hunter encounters" to meet and discuss wildlife issues. These would be an excellent opportunity to offer short training sessions. Out of such meeting consensus on a wildlife management plan could be obtained

* 2. Develop educational materials on the dangers of burning

* 3. Develop educational materials about the utility of wildlife monitoring. These materials could include a video on how to measure the game catch and the goals of wildlife management.

* 4. The Wildlife Conservation Society should provide some promise of continuity for the Lomerío Wildlife Management Program. This could come as support for the local NGO (probably APCOB) either to hire wildlife biologist consultants or to train the personnel employed by the NGO.

* 5. BOLFOR should work with APCOB to produce videos about the usefulness of wildlife management and sustainable use, and how to monitor one's own game harvest and why.

* 6. If the BOLFOR project does decide to increase the wildlife program to include more communities it becomes very important to employ another person to help with the task of reinforcing the hunter participation and collecting the data. This person could also be in charge of the community meetings to discuss wildlife issues and the utility of the program. This person would, by the time Daniel Guinart leaves, have become known to the hunters and thus the continuity of the program would not be interrupted.

* 7. BOLFOR should investigate the ethnoclassification of the Chiquitano people in order to return the collected information on plants and animals in the order and structure used by the community. By presenting accumulated information in only the scientific order, much of the "ethno" is lost. It is also important than the cultural vision of the classification of their environment be presented as equally important as the scientific one. This will help to promote pride in their culture and also prevent the loss of a valuable cultural perspective. If the ethnoclassification is studied, then environmental materials such as posters (See Appendix X) can be designed around the cultural viewpoint. This will improve the reception of the conservation message.

APPENDIX I
STEPS TOWARDS A COMMUNITY WILDLIFE MANAGEMENT PLAN IN LOMERIO, BOLIVIA

Wendy R. Townsend

A. Introduction

Many indigenous peoples obtain considerable benefit from the wildlife resources (Ojasti 1993, Clay 1988) and the Chiquitanos of Lomerío are no exception. It is imperative to include them in the wildlife management planning process because without the participation of the users of the resource no real game management is possible (Shaw 1985, Hudson et al. 1989). This is especially true where subsistence needs are filled by the resource use.

The recovery of formerly depleted game species in the United States has been possible through implementation of a self-supporting system of regulated harvests (Shaw 1985). In the U.S. this "support" comes in the form of license fees and taxes on hunting equipment which are used to hire professional wildlife managers and pay for enforcement of their management measures. However, neither the infrastructure nor the economic possibility exists in most of Latin America because subsistence hunting is practiced by the poor and it often occurs in remote areas.

> "*Although recent trends in South America have been towards increasing democratic rule, Latin America as a whole has a long tradition of government from the top down, much as it was during colonial times. This form of government presents practical problems for game management. Administration is often centralized and rigid. Enforcement of the numerous laws can be inconsistent, both in terms of which laws are enforced and which groups of people are involved. Culturally, this top-down approach can disenfranchise local people, who then see game laws as oppressive rather than for the common good (Shaw p 28:1991).*"

Therefore effective game management in areas of subsistence hunting needs to promote an understanding and partnership with the people requiring that nutritional resource.

Initial research in wildlife management programs should include adequate surveys on resource use and market pressures (Shaw 1991) which should be continued during the period of exploitation in the form of monitoring (Holt and Talbot 1978). In general, during the first few years of a wildlife management program, more time and money should be invested on research and management of non-biological factors (ie. cultural factors, economic factors; Freese and Saavedra 1991, Lagueux 1991). It is very important to ask local people what wildlife resources are most important to them, how they use them, and what they know about them (Freese and Saavedra 1991) because local people are often a

precise source of information on the ecology of wildlife (Townsend, 1995b). They also have a very high stake in the survival of their resource.

Because the community of Lomerío has a very important role in the design and implementation of a wildlife management plan, the following outline focuses on developing an informed community; and hopefully, a community which is able to make and enforce their game management decisions. This requires increasing the number of hunters collaborating by monitoring their own game take along with community education and training programs. Also included in the outline are some wildlife management options which could guide the initial community discussion sessions.

B. Prescription For Increasing Community Commitment

Some Lomerío hunters have expressed real concern for the diminishing wildlife resources near their communities. The participants of the initial community meetings and workshops have later volunteered their time to report their own game harvest and sometimes their neighbors (and even donate stomach contents and skulls). This demonstrates a real concern and desire to take action about preventing the extinction of their game species. These voluntary acts must be encouraged by telling the whole community how valuable these efforts are. This re-enforcement should be part of the community wildlife management discussion series.

B1. Community Wildlife Management Discussion Series

Frequent meetings held in participating communities can be used to discuss wildlife issues and options for solutions. A visual explanation of wildlife management options could be prepared for presentation to all the communities. Using slides would be the easiest solution, because they can be used repeatedly with less wear and tear. It is also easier for those people sitting in the back row to see. A video about the wildlife management program in Lomerío with the hunters registering their own game take, could be made in conjunction with APCOB. Repeated showing of wildlife management concepts and options through these materials should always include facilitated discussion sessions. If the slide show includes some nice wildlife photography, more people will probably come to the meetings.

At these meetings the community should be given pamphlets which explain the points and concepts being explained that evening. The same series of simple slide shows could make the booklet; however, one can express fewer points on a single slide than on a page. Any questions the community asks about it's wildlife and management should be researched and the results returned on the following visit if possible.

B2. Hunter Encounters ("Encuentros")

The hunters should be invited to participatory sessions, in their own communities, to discuss the wildlife management options. These will hopefully facilitate the

communication of the wildlife issues in Lomerío and options for solutions. These hunters should be encouraged to form an autonomous group.

B3. Fisherman Encounters

The fishermen should also have discussion sessions which particularly focus at designing a management plan for El Tumbe. If a distinct "fisherman" group exists in Lomerío, they should be the ones who decide how to improve the total river's fish population. If a distinct "fisherman" group does not exist in Lomerío then activities about fisheries should be held during community meetings.

B4. Workshops

The participatory workshops with practical training sessions should continue to introduce new topics to participating hunters. These workshops should eventually become the hunter encounters and be held in each community.

B5. Inter Community Hunter Encounters (Encuentros)

Communication between neighboring communities is imperative for the total community's management plans to work without strict enforcement of boundaries. And this should be avoided. Once the individual hunter's groups begin to coalesce they should be encouraged to communicate with their neighbors through inter-community encounters where BOLFOR supplies the transportation and perhaps the refreshment.

C. Wildlife Management Options

Wildlife managers really have two main options: to manipulate the game populations by controlling harvest (reserves, bag limits, buck harvests) or their habitat. Most wildlife biologists do some of both in an attempt to prevent overharvest (Shaw 1985, Robinson and Bolen 1984) particularly in species oriented management plans based on MSY (Maximum Sustained Yield) (Robinson and Redford 1994, Shaw 1985,1991) or other wildlife production models (Caughley 1966,1977, Robinson and Redford 1991, Bodmer 1994,1995, Townsend 1995a). Ecosystem management also includes wildlife management and probably maintains a better balance of necessary natural resources than a single species oriented management plan (Shaw 1991,1985, Robinson and Bolen 1984). MSY and other single species types of management may be unable meet the needs of future natural resource uses. The primary goal should be the maintenance of the ecosystem (Freese and Saavedra 1991).

C1. Population Manipulation

Wildlife Management measures that are based on population manipulation include bag limits, seasons, and the so called "buck laws" of male directed hunting. According to Shaw (1985) they are based on two mathematical models of game harvest:

* **Analytical models**

Accounting models require age specific estimates of fecundity and mortality,

* **Stock-recruitment models**

Stock recruitment models use the population size and the actual harvest assuming that the higher order age specific fecundity and mortality variables will be reflected in the outcome. Within stock recruitment models there are two lines of models:

Complete compensation model

This model assumes that a harvest has no real effect on a game population unless and until a certain threshold is reached and if that threshold is exceeded continuously then the population is driven to extinction (Caughley 1977)

Partial compensation model

The partial compensation model assumes that any level of harvest affects the population, first by pushing it beneath what it was at un-harvested levels and then secondly by triggering density dependence responses such as increased fecundity and survival of young, decreased natural mortality or both.

This is probably the most appropriate model and it is the one which is more accredited

Recent models are designed to avoid overharvest (Shaw 1985). However the value of the prohibitions, bag limits, male directed hunts, and seasons , is more cultural than scientific; "the most important point is that the users accept and even embrace the importance of restraint" (Shaw 1991). None of these wildlife management tools can optimize or maximize the game harvests because they lack biological precision (Shaw 1985). They also require considerable administrative authority for distributing hunting pressure and for monitoring the kill (Freese and Saavedra 1991).

C2. Habitat Manipulation

Habitat manipulation is based on the concept that some environmental factors may limit the biomass of wildlife that can be harvested from an area . These factors include water, keystone food species, and possibly salt. So that to increase the number of animals one should supply them with steady supplies of food, water and salt. In Mexico, the Mayan hunters are managing their reserve by carrying gallons of water and establishing artificial watering holes where there are no natural ones (Sanvicente Lopez 1996). In the Amazon region some indigenous groups plant late bearing fruit trees in their garden plots, although the garden will be abandoned before the trees come into fruit (Irvine 1987) Hunters in much of the Peruvian Amazon salt their areas to bring in tapir and other game animals (Puertas y Bodmer 1996).

The wildlife management technique known as “head-starting” is a manipulation of an early environment so that natural mortality in the young is less. Most commonly used with turtles, both freshwater (Podocnemis expansa) (Guiro et al. 1996) and sea turtles (Lagueux 1991).

Forest restoration occurs more often in the developed countries of the northern hemisphere. However it is a concept which might be possible by improvement of abandoned garden plots by planting animal food species, especially those species which might be keystone species (Bibosi?). The results of the student’s (Rafael) research on density of fruit species in the forests will hopefully indicate some species which are rarer, and these might be those which would be beneficial to plant.

Although many re-introduction programs have not been successful there are a few that have been such as the Golden Lion Tamarin in Brazil and the Black Caiman in Bolivia. Reintroduction of some species, starting with tatu, or corechi might be an incentive for the community to choose an area to re-establish them with protection. Capturing and moving tatu and corechi should be very inexpensive. However, for the re-introduced animals to have a chance to establish themselves, some kinds of protective measures should be prepared prior to moving animals. These could be made in terms of a reserve or an agreement to tie the dogs at night.

C3. Reserves

The ramifications of overharvesting could be particularly difficult for subsistence hunters. Mis judging the level of a sustainable harvest could cause a population crash and local extinction. Thus it is always best to include planning for areas that are held in reserve. There the animals are left to reproduce and supply an important source population for future harvests (Pulliam 1988). In some heavily farmed areas in the United States small wildlife refuges are source-sinks which supply deer to large neighboring areas. (Pulliam and Danielson 1991).

C4. Discussion of Best Wildlife management Ideas for Lomerío

The difficulty of administration and enforcement wildlife management laws and regulations means that whatever management measures are to be taken in Lomerío must have the collaboration of the people. Since it is not clear that bag limits or male directed hunting have a scientific basis as population manipulation tools, it is recommended to wait for any investigation of these techniques until community collaboration is assured . And since in the Lomerío environment many of the animals may not have seasonal reproduction, seasonal hunting restrictions would give no advantage to a yearly crop of young. That means that standard population manipulation methods of wildlife management are not useful in Lomerío at this time. Therefore I recommend that for the Lomerío community wildlife management plan focus on improving wildlife habitat within community delineated wildlife reserves, which will serve as productive sources (Townsend 1995a). Habitat improvement could include small artificial waterholes, planting particularly

important fruit species such as Bibosi, and supplying salt at a variety of locations in the forest to avoid the concentration of wildlife species in limited areas.

D. Options for Alternative Human Food Sources

One way to decrease hunting and fishing pressure is by increasing domestic production either of marketable products or of alternative protein sources. Although this type of "development" work is not, strictly speaking, wildlife management, any decrease in hunting pressure could be of benefit to biodiversity conservation. Therefore the following ideas for alternative project that could be developed are offered in the hope that some might take seed in Lomerío.

D1. Zoocría

There is a misconception that anything breathing and breeding can be profitably raised in a corral, or artificial pond (Freese and Saavedra 1991), however most neotropical species are unsuited for domestication and captive management (Terborgh, Emmons and Freese 1986, Emmons 1987). The few species that have shown themselves profitable in wildlife husbandry are those with high reproduction rates like the capybara (*Hydrochaeris hydrochaeris*; Ojasti 1973, 1991) the caiman (*Caiman crocodylus*.; Thorbjarnarson 1991), the green iguana (*Iguana iguana;* Werner 1991) and *Tupinambis* sp. Of these species, *Tupinambis* is the most promising for the Lomerío area.

The women have a desire to raise more chickens than they already raise but have found that their flocks become infested with disease. With some training in management of the basic disease control perhaps their chicken production could increase. It is also possible that cuys could offer another alternative protein resource if they are found acceptable as a food source.

The best idea for each community is to find a special skill or product which they can supply best. In the Lomerío community there are considerable works of art and carved items. Their skill is well known. One of the major things that the tourist shops lack is a choice of small statuettes showing Neotropical biodiversity. There are elephants and penguins but few animals from Bolivia. This is an open market which could also lead to an international market through the Alternative Marketing Association. Each animal could be sold with an informative paper about the animal and the names in Chiquitano.

E. Research Needs

E1. Fisheries

It is important to evaluate the length of the fish run at "El Tumbe" to explore the possibilities of a community wide agreement of leaving some days without fishing pressure for the fish to progress upstream. It is very important to find the cultural fisheries specialists in the Lomerío communities and obtain their collaboration and guidance in all the proposed research and harvest restraint measures.

A fisheries biologist should be used to study the fish migration and reproduction cycle of the Río Zapoco Norte. This study should include participation by the Lomerío fishermen to enable the most rapid data collection possible.

E2. Wildlife

At this time the most important questions to be answered to help the wildlife management plan based on habitat manipulation are about the fruit trees that are critical and perhaps the "keystone species" or limiting food sources. Understanding the wildlife food distribution over the landscape is very important in planning any wildlife habitat improvement projects.

Seeds of those food species which may be key stone resources could be collected and a small wildlife food species nursery planted. After that research on how to best promote improved production of these species could be undertaken by planting sample study plots. An interesting study might be to re-forest an abandoned garden plot by planting only a variety of wildlife food tree species. A control area, an un-manipulated abandoned garden plot could be studied using wildlife encounter rates on transects.

Research on fruit production by various keystone species such as Motacu (*Scheelea princeps*) or Bibosi (*Ficus sp*.). would be useful in pinpointing seasonal scarcities of food. This knowledge will allow planning for habitat improvement to increase those limiting food sources.

Two similar areas of Lomerío could be evaluated for wildlife encounter rates with one area given artificial water-holes. If enough area and time could be scheduled, a third area could also be provided with extra water and salt . These artificial water (and salt) sources should have track plots to register the animals use of the location. It is important to try and keep the three areas about equal in terms of hunting pressure and fruit species availability in order to best test whether salt and water could be limiting factors to wildlife populations in Lomerío.

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